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The Mineral Industry of Tunisia

UNITED STATES DEPARTMENT OF THE INTERIOR

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UNITED STATES DEPARTMENT OF THE INTERIOR • Donald Paul Hodel, Secretary

BUREAU OF MINES • T S Ary, Director

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The Mineral Industry of Tunisia

By Kevin Connor[1]

In general, economic conditions improved considerably for Tunisia in 1987. Although imports rose an estimated 3% in value, exports increased an estimated 27%, mainly due to improvements in crude petroleum and agricultural exports, caused by record-high harvests and higher oil prices. Total export receipts covered an estimated 74% of the country's import costs, up from only a 60% coverage in 1986. A 10% devaluation of the dinar, coupled with public spending cuts, caused the overall balance of payments to swing into a surplus condition. The country's growth in the overall gross national product was estimated at 5.8% for 1987.

Performance within the industrial minerals sector was mixed for the year. Tunisia's only major mineral contribution to world mineral supplies in 1987 continued to be phosphate rock and chemical fertilizers. Production of crude petroleum, Tunisia's most valuable mineral commodity, was down noticeably from the production levels of 1986. Production of steel and cement construction products was up again for another year, although mining output for most other minerals, excluding phosphate rock, was down slightly. The phosphate-based fertilizer industry showed an appreciable upturn in production, setting an all-time high. However, owing to stagnant fertilizer prices and the weakening of the U.S. dollar in which phosphates were internationally traded, there was an overall loss in export receipts. Exhaustion of deposits, and antiquated equipment continued to plague the iron ore and lead-zinc mining operations within the country.

Two Government agencies were responsible for nearly all of the nonpetroleum mineral production in Tunisia in 1987. These were the Compagnie des Phosphates de Gafsa (CPG), which consisted of eight phosphate mining operations, and Société Tunisienne d'Expansion Minière, which controlled five lead-zinc ore mines, one iron ore, and two barite and fluorspar operations. The combined labor force of these 2 agencies, which excludes limestone operations for cement manufacture, was estimated at over 19,000 persons, approximately 70% of which were miners.

Government Policies and Programs.—New petroleum exploration legislation went into effect during March. The new code was designed to encourage further foreign exploration programs in areas of Tunisia where small oil and gas fields have been discovered. Owing to their limited size, these fields have not been commercially developed. The new legislation was to charge royalties and other taxes based on ratios of profits to expenses for the international partners involved.

PRODUCTION AND TRADE

Output of important industrial minerals, excluding phosphate, was down slightly to moderately in 1987. Crude oil production was approximately 5%, or 2 million barrels less than that of 1986. The decrease was due to declines in production from the country's two main producing fields, El Borma in the southwest, which accounted for 65% of the production, and the offshore Ashtart Field, which accounted for most of the remainder.

For the third year in a row, Tunisian exports of cement rose dramatically. Ce-

ment exports increased by approximately 300% over those of 1986 and reached almost 600,000 tons.

Phosphate rock production increased 7% over that of 1986. The fertilizer sector had mixed results. Production of monoammonium phosphate approximately doubled, while triple superphosphate production was up moderately. Small declines or stagnant conditions were recorded for the production of phosphoric acid, diammonium phosphate, and dicalcium phosphate. Owing to continuing equipment problems and exhaustion of economic deposits, output of iron ore and lead and zinc concentrates was down slightly. Drawn steel products were down slightly, but the remaining steel subsectors—castings, rolled products, and steel structures—showed growth. Along with the increased demand for industrial steel goods, the strong demand for cement exports caused total cement sales to surge 13% over those of 1986.

Major mineral trading between Tunisia and the United States was limited to crude petroleum exports to the United States. Tunisia imported little or no mineral raw materials from the United States, although the United States continued to be a major supplier of heavy equipment to Tunisia. Exploration by U.S. petroleum companies continued to constitute the largest category of U.S. investment in Tunisia.

Table 1.—Tunisia: Production of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity[2]	1983	1984	1985	1986[p]	1987[e]
METALS					
Iron and steel:					
Iron ore and concentrate, gross weight thousand tons	316	309	306	311	300
Metal:					
Pig iron do	147	150	e150	150	150
Steel, crude do	163	169	170	181	180
Lead:					
Mine output, Pb content	4,570	4,056	2,484	1,930	2,000
Metal:					
Primary[3]	10,398	8,400	2,040	2,208	2,200
Secondary[e]	500	500	500	500	500
Total[e]	10,898	8,900	2,540	2,708	2,700
Silver metal, primary thousand troy ounces	90	85	26	50	50
Zinc, mine output, Zn content	7,548	6,660	5,580	4,488	4,500
INDUSTRIAL MINERALS					
Barite	20,250	12,100	20,000	15,718	20,000
Cement, hydraulic thousand tons	2,850	2,777	3,070	2,984	3,400
Clays, construction[e] do.	350	350	350	350	350
Fluorspar, chemical- and metallurgical-grade	34,013	44,510	42,240	36,828	40,000
Gypsum[e]	80,000	85,000	90,000	100,000	100,000
Lime thousand tons	580	600	e600	650	650
Phosphate rock, gross weight do.	5,924	5,346	4,530	5,951	46,390
Salt, marine do.	375	330	382	415	420
MINERAL FUELS AND RELATED MATERIALS					
Gas, natural:					
Gross[e] million cubic feet	28,000	28,000	28,000	28,000	28,000
Marketed do.	14,503	14,080	14,000	14,000	14,000
Petroleum:					
Crude thousand 42-gallon barrels	42,649	42,251	41,000	42,000	40,000
Refinery products:					
Gasoline do.	1,546	1,794	e1,800	e1,800	1,800
Kerosene do.	2,085	2,402	e2,400	e2,400	2,400
Distillate fuel oil do.	2,988	3,156	e3,000	e3,000	3,000
Residual fuel oil do.	3,937	3,936	e4,000	e4,000	4,000
Other do.	460	394	e400	e400	400
Refinery fuel and losses do.	235	160	e200	e200	200
Total do.	11,251	11,842	e11,800	e11,800	11,800

[e]Estimated. [p]Preliminary.

[1]Table includes data available through June 9, 1988.

[2]In addition to the commodities listed, a variety of crude construction materials (common clays, sand and gravel, and stone) is produced, but output is not reported, and available information is inadequate to make reliable estimates of output levels. Limestone quarried for cement manufacture is substantial; however, information is inadequate to make accurate estimates of output.

[3]From domestic and imported ores.

[4]Reported figure.

Table 2.—Tunisia: Exports of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity	1986	Destinations, 1986	
		United States	Other (principal)
METALS			
Aluminum:			
Oxides and hydroxides	46	--	All to Algeria.
Metal including alloys:			
Scrap	559	--	France 205; Italy 166; United Kingdom 72.
Semimanufactures	1,641	(2)	Algeria 1,621; France 20.
Copper: Metal including alloys, scrap	1,051	--	Spain 673; France 288.
Iron and steel:			
Iron ore and concentrate excluding roasted pyrite	3,025	--	All to Netherlands.
Metals:			
Scrap	1,457	--	Italy 1,343.
Steel, primary forms	765	--	All to Italy.
Semimanufactures:			
Bars, rods, angles, shapes, sections	57	--	Algeria 55.
Universals, plates, sheets value, thousands	$4,046	--	Algeria $4,005; United Kingdom $41.
Hoop and strip	10	--	All to Austria.
Wire	499	--	Alteria 350; West Germany 149.
Tubes, pipes, fittings value, thousands	$15,106	$1	Algeria $12,088; United Arab Emirates $2,730.
Lead:			
Ore and concentrate	3,000	--	All to France.
Oxides	335	--	All to Algeria.
Metal including alloys, scrap	588	--	Italy 329; West Germany 259.
Magnesium: Metal including alloys, scrap	14	--	All to Belgium-Luxembourg.
Zinc:			
Ore and concentrate value, thousands	$713	--	United Kingdom $432; Yugoslavia $238.
Metal including alloys, scrap	20	--	All to Italy.
INDUSTRIAL MINERALS			
Abrasives, n.e.s.: Grinding and polishing wheels and stones	5	--	All to Algeria.
Cement	272,027	--	Cameroon 182,515; Spain 60,118.
Diamond: Gem, not set or strung value, thousands	$6,738	--	All to Belgium-Luxembourg.
Feldspar, fluorspar, related materials	6,100	--	All to Italy.
Fertilizer materials: Manufactured:			
Nitrogenous	32,998	--	France 23,829; United Kingdom 3,728; Netherlands 2,750.
Phosphatic	1,335,683	--	China 256,458; France 185,328; Italy 184,640.
Phosphates, crude thousand tons	1,206	--	Romania 278; Greece 179; France 168.
Salt and brine	359,568	--	Italy 145,674; Brazil 96,210; Norway 28,620.
Stone, sand and gravel:			
Dimension stone, worked value, thousands	$2	$2	
Quartz and quartzite	1	--	Mainly to France.
Sand other than metal-bearing	15	--	Spain 7; France 3.
Other: Slag and dross, not metal-bearing	1,024	--	All to Italy.
MINERAL FUELS AND RELATED MATERIALS			
Petroleum:			
Crude thousand 42-gallon barrels	28,714	535	Italy 9,861; Greece 4,411; France 4,121.
Refinery products:			
Gasoline, motor 42-gallon barrels	518,602	--	Netherlands 314,441; unspecified 204,161.
Kerosene and jet fuel do.	35,263	--	All for bunkers.
Distillate fuel oil do.	1,488,357	--	France 638,154; Netherlands 265,721; Mozambique 166,560.
Lubricants do.	84	28	NA.
Bituminous mixtures do.	18	--	All to Algeria.

NA Not available.

[1]Table prepared by Viginia A. Woodson. Data for 1985 were not available at the time of publication.

[2]Unreported quantity valued at $4,000.

Table 3.—Tunisia: Imports of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity	1986	Sources, 1986	
		United States	Other (principal)
METALS			
Alkali and alkaline-earth metals	1	--	All from France.
Aluminum:			
Oxides and hydroxides	26,859	NA	Italy 19,696; France 7,158.
Metal including alloys:			
Unwrought	1,956	--	Canada 1,735; Greece 200.
Semimanufactures	2,540	(2)	Italy 791; Austria 389; Belgium-Luxembourg 366.
Chromium: Oxides and hydroxides	27	--	West Germany 16; Belgium-Luxembourg 5.
Cobalt: Oxides and hydroxides	1	--	Mainly from Spain.
Copper:			
Matte and speiss including cement copper	96	--	All from Italy.
Metal including alloys:			
Scrap	2	--	All from France.
Unwrought	316	--	Italy 304; France 10.
Semimanufactures	7,438	NA	France 4,726; Belgium-Luxembourg 1,391.
Iron and steel:			
Iron ore and concentrates excluding roasted pyrite	70,689	--	Morocco 57,284; Mauritania 13,405.
Metal:			
Scrap	537	100	Netherlands 300; France 137.
Pig iron, cast iron, related materials	1,422	2	West Germany 739; Brazil 500.
Ferroalloys:			
Ferromananese	370	--	All from France.
Unspecified	1,364	--	Yugoslavia 500; Norway 310; Venezuela 250.
Steel, primary forms	38,382	--	Spain 38,365.
Semimanufactures:			
Bars, rods, angls, shapes, section	104,072	(3)	Spain 37,914; Romania 22,121; France 9,213.
Universals, plates, sheets	110,625	(4)	Italy 28,019; France 22,670; West Germany 17,274.
Hoop and strip	3,544	--	France 2,183; Italy 708.
Rails and accessories	243	--	Bulgaria 78; France 57; Portugal 31.
Wire	2,576	NA	France 1,053; Belgium-Luxembourg 500; Italy 459.
Tubes, pipes, fittings	17,912	442	France 8,666; Italy 4,138; Japan 1,949.
Castings and forgings, rough	59	--	Spain 44; Italy 13.
Lead:			
Oxides	115	--	Italy 40; France 24; West Germany 20.
Metal including alloys:			
Unwrought	2,709	--	Morocco 1,210; Mexico 948; Peru 350.
Semimanufactures	9	--	France 8.
Magnesium: Metal including alloys, semimanufactures	4	--	United Kingdom 3; France 1.
Manganese:			
Ore and concentrate, metallurgical-grade	155	--	Gabon 115; France 40.
Oxides	103	--	France 47; West Germany 27; Belgium-Luxembourg 25.
Mercury, 76-pound flasks	319	--	Algeria 290; France 29.
Molybdenum: Metal including alloys, all forms, value, thousands	$18	--	Austria $9; Sweden $7.
Nickel:			
Matte and speiss, do.	$2	--	All from United Kingdom.
Metal including alloys, semimanufactures	90	--	United Kingdom 52; France 18.
Platinum-group metals: Metals including alloys, unwrought and partly wrought, value, thousands	$30	--	Belgium-Luxembourg $20; West Germany $4.
Silver: Metal including alloys, unwrought and partly wrought, do.	$70	--	France $41; Italy $15; France $11.
Tin: Metal including alloys:			
Unwrought	36	--	Indonesia 17; United Kingdom 12.
Semimanufactures	19	--	West Germany 11; United Kingdom 4.

See footnotes at end of table.

Table 3.—Tunisia: Imports of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1986	Sources, 1986	
		United States	Other (principal)
METALS —Continued			
Titanium: Oxides	307	15	France 127; West Germany 110.
Tungsten: Metal including alloys, all forms value, thousands	$23	$4	West Germany $13; France $6.
Zinc:			
Oxides	375	--	France 136; Belgium-Luxembourg 127; West Germany 70.
Metal including alloys:			
Unwrought	2,271	--	Algeria 954; Italy 424; France 404.
Semimanufactures	334	--	Spain 144; Italy 118; France 54.
Other:			
Ores and concentrates	60	--	All from Italy.
Oxides and hydroxides	131	41	Belgium-Luxembourg 36; West Germany 25.
INDUSTRIAL MINERALS			
Abrasives, n.e.s.:			
Natural: Corundum, emery, pumice, etc	708	--	Turkey 188; Italy 144; United Kingdom 138.
Artificial: Corundum	183	--	Italy 103; France 58.
Dust and powder of precious and semiprecious stone including diamond value, thousands	$43	--	Belgium-Luxembourg $42.
Grinding and polishing wheels and stones	177	NA	Italy 94; France 30.
Asbestos, crude	9,207	--	Canada 4,630; Zimbabwe 2,031.
Barite and witherite	90	--	All from France.
Boron materials: Oxides and acids	48	--	France 42; West Germany 6.
Cement	60,272	2	France 46,199; Belgium-Luxembourg 8,568.
Chalk	2,354	--	France 1,932; Italy 397.
Clays, crude	34,932	78	Italy 9,673; France 7,892; United Kingdom 6,046.
Diamond: Gem, not set or strung value, thousands	$11,255	--	Belgium-Luxembourg $10,615.
Diatomite and other infusorial earth	167	--	All from France.
Feldspar, fluorspar, related materials	8,190	--	Spain 3,756; Suriname 2,878.
Fertilizer materials: Manufactured:			
Ammonia	203,801	62,790	Bahrain 58,878; U.S.S.R. 31,014; Kuwait 19,010.
Nitrogenous	8,169	--	Italy 4,325; Bulgaria 1,880; Egypt 1,300.
Phosphatic	150	--	All from Italy.
Potassic	15,021	--	East Germany 5,500; Belgium-Luxembourg 3,000; Jordan 2,700.
Unspecified and mixed	75	--	France 30; Belgium-Luxembourg 25; West Germany 20.
Graphite, natural	1	--	All from France
Gypsum and plaste	519	--	Do.
Lime	131	--	Do.
Magnesite	480	--	Greece 291; Netherlands 72.
Mica:			
Crude including splittings and waste	13	--	All from Canada.
Worked including agglomerated splittings value, thousands	$9	--	France $6; Austria $2.
Phosphates, crude do	$1	--	All from France.
Pigments, mineral: Iron oxides and hydroxides, processed	168	--	West Germany 53; Netherlands 51; Belgium-Luxembourg 27.
Precious and semiprecious stones other than diamond:			
Natural value, thousands	$5	--	West Germany $4; Saudi Arabia $1.
Pyrite, unroasted	10	--	All from Italy.
Salt and brine	71	--	West Germany 62; United Kingdom 6.
Sodium compounds, n.e.s.:			
Carbonate, manufactured	6,299	--	Italy 3,401; France 1,752.
Sulfate, manufactured	33,496	--	Spain 18,015; France 11,442.
Stone, sand and gravel:			
Dimension stone:			
Crude and partly worked	19,080	--	Italy 15,045; Turkey 2,327.
Worked	564	--	Italy 559.
Dolomite, chiefly refractory-grade	509	--	France 399; Spain 100.
Gravel and crushed rock	47,372	--	Italy 26,253; Greece 20,963.
Quartz and quartzite	925	--	Belgium-Luxembourg 856; France 55.
Sand other than metal-bearing	1,104	11	Belgium-Luxembourg 1,053.

See footnotes at end of table.

Table 3.—Tunisia: Imports of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1986	Sources, 1986	
		United States	Other (principal)
INDUSTRIAL MINERALS —Continued			
Sulfur:			
Elemental:			
Crude including native and byproduct thousand tons	1,096	338	Canada 323; Saudi Arabia 104.
Colloidal, precipitated, sublimed	48	--	West Germany 46; Italy 2.
Sulfuric acid	46	--	France 30; Sweden 14.
Talc, steatite, soapstone, pyrophyllite	1,044	--	France 610; Spain 301; Italy 115.
Other: Crude	9	--	France 4; China 3.
MINERAL FUELS AND RELATED MATERIALS			
Asphalt and bitumen, natural	7	1	France 6.
Carbon black	1,595	--	Italy 1,079; France 252.
Coal:			
Anthracite and bituminous	12,258	--	France 10,510; Morocco 1,748.
Lignite including briquets	4	--	All from West Germany.
Coke and semicoke	81,153	--	West Germany 48,628; Italy 20,901; Algeria 11,616.
Peat including briquets and litter	1	--	All from France.
Petroleum refinery products:			
Gasoline, motor 42-gallon barrels	26	--	West Germany 17.
Mineral jelly and wax do.	6,941	--	France 3,927; West Germany 2,487; Hungary 260.
Kerosene and jet fuel do.	702,414	--	Italy 288,323; Greece 216,752; Kuwait 111,507.
Lubricants do.	24,682	(5)	France 7,924; Italy 5,579; West Germany 3,738.
Residual fuel oil do.	5,401,573	55,371	Spain 1,965,200; Italy 1,120,092; France 994,218.

NA Not available.
[1]Table prepared by Virginia A. Woodson. Data for 1985 were not available at the time of publication.
[2]Unreported quantity valued at $27,000.
[3]Unreported quantity valued at $7,000.
[4]Unreported quantity valued at $4,000.
[5]Unreported quantity valued at $5,000.

COMMODITY REVIEW

METALS

International companies were invited to bid on an estimated $10 million contract to upgrade one of the two rolling mills at Tunisia's only integrated steel plant, El Fouladh at Menzel Bourguiba. The wire-rod mill was to be expanded from a capacity of 75,000 tons to 130,000 tons per year. The Fouladh complex operated at full capacity, producing approximately 190,000 tons of finished product in 1987, but was still unable to meet local demand. Planning continued for modifying the electric arc furnace at the complex to increase capacity. Owing to budget difficulties, plans to build a second integrated steel complex for Tunisia have been set back.

INDUSTRIAL MINERALS

Cement.—The newly commissioned white cement plant at Feriana, near the Algerian border, began production operations at the very end of 1987. The plant was owned and operated by the Société Tuniso-Algerienne de Ciment Blanc, a joint venture operation between Algeria and Tunisia, and financed jointly by both Governments. This is the first industrial project to be entered into between these two countries, and was also the first white cement plant built in North Africa. The 210,000-ton-per-year plant was built by Creusot Loire Entreprise of France on a turnkey contract basis for $119 million.[2] Output from the plant was expected to cover all local needs, Algerian needs, and provide 20,000 to 30,000 tons for export. The plant product was to be transported by truck approximately 20 miles to an existing Algerian railroad line in 1988. Construction of a railroad link between the plant complex to the existing rail line was expected to get underway before mid-1988.

Fertilizer Materials.—After a thorough investigation during the early 1980's by Tunisia's Société Industrielle d'Acide Phosphorique et d'Engrais (SIAPE), the folded-bed chemical separation process (FBCSP) was selected for use in a magnesium-removal demonstration plant to be built at Sfax. Developed by American Pembroke Inc. and Swenson Process Equipment Inc.,

both of the United States, the plant was commissioned in September 1986. The results of the first 6 months of nonstop operations were made public in midyear 1987.

Local reserves of high-magnesium-content phosphate rock have been known to be in existence in the Sfax area for some time. However, the high magnesium content of the rock had prevented any development. The magnesium problem as assessed had to be dealt with, either through the improved beneficiation of the phosphate rock or through processing of the downstream phosphoric acid. Employing the FBCSP process was an attempt at the latter solution. The process uses an ion-exchange resin to remove magnesium and, coincidentally, calcium from filter-grade phosphoric acid.

The demonstration plant, with a capacity of 13,900 tons per year of P_2O_5, was adjacent to SIAPE's phosphoric acid plants at Sfax. The plant was designed and built by Swenson and Spie Batignolles S.A. of France. Swenson, as exclusive process licensor, provided the crucial engineering, while Spie Batignolles provided detailed engineering and construction of the plant. The plant took 16 months to design and build and was initially completed late in 1985, although problems delayed the commissioning until the latter half of 1986. Initial testing results at the plant were positive. However, consideration of full-scale use of the process in the Sfax area was to await further testing.

Also at Sfax and nearing completion of construction at yearend was the SIAPE 2. The complex was expected to come on-line in January 1988. Estimated production of the plant at full capacity was 360,000 tons per year concentrated phosphoric acid and 330,000 tons per year of concentrated superphosphoric acid. The approximate cost of building the complex was $175 million. It was expected to employ 500 people.

MINERAL FUELS

Petroleum.—Petroleum company officials were in agreement that the petroleum legislation passed by the Tunisian Parliament in April offered immediate benefits that would deter international companies from pulling out of petroleum exploration ventures there. Income tax breaks and a better system for accessing royalty payments were two major concessions to the international partners. The new legislation also enticed new firms to come to Tunisia to explore for oil. Pan Ocean Oil Co. of Geneva, Switzerland, secured an exploration concession in the Sbeitla region. Partly as a result of the legislation, as many as 25 exploration wells were expected to be drilled by international companies in 1988. The Tunisian State Petroleum Agency, Entreprise Tunisienne d'Activités Petrolières (ETAP) was expected to drill as many as 12 wells in 1988, the same number spudded by ETAP in 1987.

Late in 1987, Azienda Generali Italiana Petroli S.p.A. of Italy made a discovery in its Enfida permit of Block 10 off the Tunisian coast. The well, Maamoura-1, flowed at 2,880 barrels per day of 38° API crude from depths of 2,486 meters and 2,506 meters. Another well in the area was being drilled at yearend. The Marathon Oil Co. (United States) completed three wells in its Zarsis permit during the year. The first two wells struck sizable quantities of oil, but the third proved dry. Additional seismic testing was done in the fourth quarter of 1987, and spudding of a fourth well was planned for the first quarter of 1988, the location of which was to be based on evaluation of the data underway at yearend. Marathon was also involved in two other concessions in 1987.

Pennzoil Tunisia Inc. of the United States completed a third well in October in its Didon-Elyssa permit of Block 16. Results were still being evaluated at yearend. Houston Oil & Minerals Corp. of Tunisia conducted drilling in its offshore Isis permit in 1987; the U.S.-based company planned to continue drilling throughout 1988.

Several other international firms planned major exploration programs to begin in 1988. The Kuwait Foreign Petroleum Exploration Co. planned to drill three or four wells in its Kairouan Nord and Kairouan Sud areas of Blocks 17 and 18. Drilling was underway at yearend by Elf Aquitaine Tunisie in its Kirchaou permit of Block 14. ETAP and Italy's Petrex were Elf's partners in this concession.

[1]Physical scientist, Division of International Minerals.

[2]Where necessary, values have been converted from Tunisian dinars (D) to U.S. dollars at the rate of D0.78=US$1.00.

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